ABSTRACT

A method and apparatus for case hardening a work piece by inductive heating is disclosed. In one embodiment, the apparatus includes a ring of conductive material having an inner diameter, an outer diameter, and opposing planar sides. In one embodiment, dielectric material fixed to the planar sides of the ring prevents the electrical power passing through the conductive material from short circuiting. In another embodiment of the invention, a plurality of conductive teeth extend radially from at least one of the inner diameter and the outer diameter of the ring, wherein a valley having a vertex is formed between adjacent conductive teeth, and conductive material is removed from the ring proximal the vertex to prevent overheating gear teeth of the work piece being hardened. In yet another embodiment of the invention, a plurality of conductive teeth extending radially from at least one of the inner diameter and the outer diameter and at least one slot extending radially toward a tip of one of the teeth is formed in the conductive material to force the electric current closer to the teeth being hardened.